

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Amended) A changeable lock assembly that can be reconfigured to operate with different keys of a set of user [key] keys, without disassembling the lock, comprising:

a) a housing having a generally cylindrical bore with an inner surface and a plurality of generally cylindrical driver chambers intersecting the bore surface;

b) a plurality of generally cylindrical drivers, each driver being positioned and movable within one driver chamber and being urged toward the bore surface;

c) a plug having a generally cylindrical periphery and rotatably mounted within the bore so as to form a shear line at the interface of the bore surface and the plug periphery, the plug further having:

- 1) a longitudinal axis;
- 2) a keyway intersecting the periphery and parallel to the longitudinal axis and configured to receive a key selected from a subset of keys, the subset of keys including at least a first key having a first contour edge that operates the lock in a first lock configuration but does not operate the lock in a second lock configuration, and a second key having a second contour edge that operates the lock in the second lock configuration but does not operate the lock in the first lock configuration, wherein the first contour edge and the second contour edge have at least a first contour position and a second contour position that are differently configured;
- 3) a plurality of generally cylindrical tumbler chambers intersecting the periphery and the keyway, and being generally orthogonal to the longitudinal axis, each tumbler chamber being aligned with a driver chamber when the plug is at a first rotated position with respect to the housing so as to form a pin chamber; and
- 4) a plurality of retainer cavities intersecting the periphery, each retainer cavity being spaced apart from a corresponding tumbler chamber and aligned with a corresponding driver chamber when the plug is at a second rotated position with

respect to the housing; and

- 5) a change tool slot configured parallel to the longitudinal axis, that extends from the front face of the plug and intersects a portion of each of the retainer cavities;
- d) a plurality of tumblers, each tumbler being positioned and movable within one tumbler chamber;
- e) a plurality of lock configuration change balls, each change ball being associated with one pin chamber, having a first position within the pin chamber between the driver and tumbler, and a second position within the retainer cavity, and being movable from the second position within the retainer cavity upon insertion of a change tool into the change tool slot.

2. (Original) The changeable lock assembly of Claim 1 wherein the first contour position of the first key is a lower position and the second contour position of the first key is a raised position, and wherein, when the lock is configured to operate with the first key, a first change ball corresponding to the first contour position is disposed in its pin chamber, and a second change ball corresponding to the second contour position is disposed in its retainer cavity.

3. (Original) The changeable lock assembly of Claim 2 wherein the first contour position of the second key is a raised position and the second contour position of the second key is a lower position, wherein the driver that is disposed in the pin chamber corresponding to the second contour position spans across the shear line when the second key is inserted into the keyway, whereby the plug can not rotate within the housing, such that the second key can not operate the lock.

4. (Amended) The changeable lock assembly of Claim 1 [wherein the lock has a reset configuration,] wherein, when an operable key is disposed in the keyway and the plug is at the second rotated position, and the change tool is positioned within the change tool slot, any change ball in its second position has been moved into its corresponding driver chamber.

5. (Cancelled)

6. (Amended) A changeable lock assembly comprising:

- a) a housing having a bore therein;
- b) a plug rotatably mounted in the [said the] bore, the plug having:
 - i) a longitudinal axis;
 - ii) a first passage parallel to the longitudinal axis, and configured to receive a key selected from a subset of user keys, said subset of user keys comprising at least a first user key and a second user key, each user key having at least one contour position;
 - iii) a second passage configured in the plug to receive a change tool, and
- c) [a] at least one change member movable within the lock between a first position in the plug [lock] and a second position in the plug, the change member being movable from the first position to the second position, to reconfigure the lock for operation with the second user key, solely in response to insertion of the second user key into the first passage and rotation of the plug by the operation of the second user key;
wherein when the change member is in the first position, the first user key operates the lock, [and] wherein when the change member is in the second position, the first user key does not operate the lock, and wherein the second passage intersects a portion of the second position in the plug.

7. (Amended) A changeable lock assembly comprising:

- a) a housing having a bore therein;
- b) a plug rotatably mounted in the [said the] bore, the plug having a longitudinal axis, and a first passage parallel to the longitudinal axis, and configured to receive a key selected from a subset of keys, said subset of user keys comprising at least a first user key, [and] a second user key, and a third user key, each user key having at least one contour position; and
- c) a plurality of change member comprising at least a first and a second change member, movable within the lock between a first position in the plug [lock] and a second position in the plug, the first change member being movable from its [the] first position to its [the] second position solely in response to insertion of the second user key into the first passage and rotation of the plug by the operation of the second user key, the second change member being moveable from its first position to its second position solely in response to insertion of the third user key into the first passage and rotation of the plug by operation of the third user key;

wherein when the first change member is in its [the] first position, the first user key operates the lock;[, and] wherein when the first change member is in its [the] second position and the second change member is in its first position, the first user key does not operate the lock, but the second user key can operate the lock; and wherein when the first and second change members are in their second positions, the first user key and second user key can not operate the lock but the third user key can operate the lock.

8. (Amended) The lock assembly of claim 6 [7], wherein the plug further has a retainer cavity that is configured to receive the change member when the change member is in the second position.

9. (Amended) The lock assembly of claim 8, wherein the plug further has a second passage configured in the plug to receive a change tool, wherein the second passage its intersects [intersecting] the retainer cavity, and wherein the change member can be disposed in the retainer cavity when the change tool is not positioned in the second passage.

10. (Original) The lock assembly of claim 8, wherein the change member cannot be disposed in the retainer cavity when the change tool is positioned in the second passage.

11. (Amended) The lock assembly of claim 8, wherein the change member is movable from the first position to the second position only when the change tool is not positioned in the second passage.

12. (Original) The lock assembly of claim 8, wherein the change member is movable from the second position to the first position when the change tool is positioned in the second passage.

13. (Amended) The lock assembly of claim 7, wherein the at least one contour position comprises a plurality of contour locations, comprising [includes] raised contour locations and lowered contour locations.

14. (Original) The lock assembly of claim 13, wherein two contour locations of the plurality of contour locations are raised contour locations, and the remainder of the contour locations are lowered contour locations.

15. (Original) The lock assembly of claim 14, wherein the first key has a first top edge contour and the second key has a second top edge contour, the first top edge contour having at least one lowered contour location corresponding to one of the two raised contour locations of the second top edge contour.

16. (Withdrawn) The lock assembly of claim 7 wherein the plug further has a first groove configured in the plug, the first groove extending radially and outwardly from the longitudinal axis, and further comprising a radial tumbler disposed in the first groove for circumferential motion about the longitudinal axis in the first groove.

17. (Withdrawn) The lock assembly of claim 16 wherein the radial tumbler comprises a distal end, and further comprising a spring in confronting relationship with the radial tumbler, wherein the spring biases the radial tumbler such that the distal end extends into the first passage.

18. (Withdrawn) The lock assembly of claim 17, wherein the radial tumbler further has a notch, wherein the housing further has a second groove configured therein, and further comprising a movable side bar disposed in a side bar cavity configured in the plug, the side bar having a proximal end and a distal end, the proximal end adapted to insert into the notch in the radial tumbler, and the distal end adapted to confront the second groove.

19. (Withdrawn) The lock assembly of claim 16 further comprising a memory block disposed in the first groove and being movable between a first memory block position and a second memory block position, wherein when the memory block is in the first memory block position, the change member cannot move between the first and the second positions, and wherein when the memory block is in the second memory block position, the change member can move between the first and the second positions.

20. (Withdrawn) The lock assembly of claim 19, wherein the memory block is in the first memory block position when the change tool is not in the second orifice.

21. (Withdrawn) The lock assembly of claim 19, wherein the memory block is in the second memory block position when the change tool is in the second orifice.

22. (Original) The lock assembly of claim 11, further comprising a shim disposed in the lock adjacent to the change member when the change member is in the first position.

23. (Original) The lock assembly of claim 22, wherein the shim has a first diameter and the retainer cavity has a second diameter, the first diameter being greater than the second diameter.

24. (Amended) A method for reprogramming a lock, the method comprising:

a) providing an adaptable lock assembly comprising a housing having a bore therein, a plug rotatably mounted in the bore, the plug having a longitudinal axis, the plug further including a first orifice parallel to the longitudinal axis, the first orifice adapted to receive a key selected from a subset of keys, [the subset of keys including at least a first key and a second key,] and at least a first and a second change member disposed in a first position in the plug, each movable within the lock between the [a] first position [in the lock] and a second position in the plug, [the change member being movable from the first position to the second position solely in response to rotation of the plug by operation of the second key, wherein when the change member is in the first position, the first key operates the lock, and wherein when the change member is in the second position, the first key does not operate the lock];

b) providing a subset of keys, the subset of keys including at least a first user key, [and] a second user key, and third user key, each of the [first] user keys [and the second key including] comprising a different top contour, [the second key having a different top contour than the first key,] the first key being operable to operate the lock;

c) inserting the second user key into the first orifice; [and]

d) moving the first change member from its [the] first position to its [the] second position solely in response to rotation of the plug by the second key, such that the first user key is inoperable to operate the lock,

e) inserting the third user key into the first orifice, and
f) moving the second change member from its first position to its second position solely in response to rotation of the plug by the third user key, such that the first and second user keys are inoperable to operate the lock.

25. (Amended) The method of claim 24, wherein the plug further includes a second orifice disposed in the plug, the second orifice intersecting a plurality of retainer [cavity] cavities, each adapted to receive the change member, the second orifice adapted to receive a change tool.

26. (Cancelled)

27. (Amended) The method of claim 25, further comprising the step of positioning the change tool in the second passage, and moving the change member from the second position to the first position.

28. (Original) The method of claim 27, wherein moving the change member from the second position to the first position further comprises inserting the change tool in the second orifice, rotating the plug in the housing, and subsequently removing the change tool from the second orifice.

29. (Withdrawn) The method of claim 25 further comprising a memory block disposed in the plug and movable between a first memory block position and a second memory block position, wherein when the memory block is in the first memory block position, the change member cannot move between the first and the second positions, and wherein when the memory block is in the second memory block position, the change member can move between the first and the second positions.

30. (Withdrawn) The method of claim 29, further comprising moving the memory block from the first memory block position to the second memory block position.

31. (Withdrawn) The method of claim 30, wherein moving the memory block from the first memory block position to the second memory block position further comprises inserting the change tool into the second orifice.

32. (Withdrawn) The method of claim 231, further comprising moving the memory block from the second memory block position to the first memory block position.

33. (Withdrawn) The method of claim 32, wherein moving the memory block from the second memory block position to the first memory block position further comprises removing the change tool from the second orifice.

34. (Cancelled)

35. (Withdrawn) A changeable lock assembly comprising:

- a) a housing having a bore therein;
- b) a plug rotatably mounted in the bore, the plug having a longitudinal axis, the plug further including a first passage parallel to the longitudinal axis, the first passage adapted to receive at least a first key and a second key; and
- c) first and second subsets of pin chambers, wherein each pin chamber of the first subset of pin chambers lies in a first plane perpendicular to the longitudinal axis, and wherein each pin chamber of the second subset of pin chambers lies in a second plane perpendicular to the longitudinal axis, and wherein the first plane and the second plane are not coplanar.

36. (Withdrawn) A method of making a changeable lock plug by machining a standard lock plug, comprising the steps of:

- a) providing a standard lock plug having a keyway, an axial centerline and a circumferential surface, the standard plug further having a plurality of tumbler chambers extending through the circumferential surface along a first line extending parallel to the axial centerline, wherein each tumbler chamber extends into the keyway and has a centerline that is spaced apart by a first distance from an adjacent tumbler chamber; and

b) machining a plurality of retainer cavities into the standard plug through the circumferential surface along a second line extending parallel to the axial centerline, wherein each retainer cavity extends into the plug body is displaced radially from a corresponding tumbler chamber by an arc angle along the circumferential surface.

37. (Withdrawn) The method according to Claim 36, further comprising the step of c) cutting a slot along the axial direction in the outer surface of the plug along the same line as the retainer cavities.

38. (Withdrawn) The method according to Claim 36 further comprising the step of installing pins, springs, and a change ball in a programmed arrangement, in assembling the plug into the lock housing.

39. (Withdrawn) The method according to Claim 36 wherein the retainer cavities are drilled 95% of the size of a driver used in the tumbler chamber.

40. (Withdrawn) A method of machining a plug for a variable change lock, comprising:

a) providing a plug body having a keyway, an axial centerline, and a circumferential surface;

b) machining a plurality of tumbler chambers through the circumferential surface along a first line extending parallel to the axial centerline, wherein each tumbler chamber extends into the keyway and has a centerline that is spaced apart by a first distance from an adjacent tumbler chamber;

c) machining a plurality of retainer cavities through the circumferential surface along a second line extending parallel to the axial centerline, wherein the retainer cavities extend into the plug body, and each retainer cavity is displaced radially from a corresponding tumbler chamber by an arc angle along the circumferential surface; and

d) machining a slot through the circumferential surface and along the second line.

41. (Withdrawn) The method according to Claim 40 wherein the retainer cavity has an effective diameter, and the retainer cavity is machined to a depth of at least one effective diameter.
42. (Withdrawn) The method according to Claim 40 wherein the tumbler chambers and retainer cavities are machined simultaneously.
43. (Withdrawn) The method according to Claim 40 wherein the arc angle is between about 30° and about 120° from the first line.
44. (New) The changeable lock assembly of Claim 1 wherein each retainer cavity has an opening of a size smaller than the diameter of the driver, wherein the driver can not enter through the opening and into the retainer cavity when the plug is in its second rotated position.
45. (New) The changeable lock assembly of Claim 1 wherein the change tool is remote from the lock during operation of the lock.
46. (New) The changeable lock assembly of claim 4 wherein the lock has a reset configuration wherein each change ball is disposed in its tumbler chamber when no key is inserted into the keyway.
47. (New) The changeable lock assembly of claim 46 wherein the lock can be configured for operation by a user key by insertion of the user key into the keyway of the lock in reset configuration, and rotation of the plug to its second rotated position.
48. (New) The changeable lock assembly of claim 1 wherein the change tool has a linear upper edge that can raise each change ball out of its respective retainer cavity.
49. (New) The changeable lock assembly of claim 1 wherein the same change tool can be used to reset the lock and to reconfigure the lock for any key of the subset of keys.

50. (New) The changeable lock assembly of claim 1, further comprising a programming key having a contour edge configured to raise any change ball in a tumbler chamber above the shear line upon its insertion into the keyway, and upon its operation of the lock, to move the change ball into its respective retainer cavity upon rotation of the plug to its second rotated position, wherein the lock can be operated with the programming key, but not with the user keys.
51. (New) The changeable lock assembly of Claim 1 wherein the lock can not be configured to operate with a user key when the change tool is disposed within the change tool slot.
52. (New) The changeable lock assembly of Claim 1 wherein the lock can be reconfigured only when all of the change balls have been disposed in their respective pin chambers.
53. (New) The changeable lock assembly of Claim 1 further comprising a plurality of master shim disposed between each tumbler pin and the change member when the change member is in its first position, the master shim having a first diameter and the retainer cavity having a second diameter, the first diameter being greater than the second diameter.
54. (New) The changeable lock assembly of Claim 53 further comprising a master key having a contour edge configured to raise the plurality of master pins above the shear line, wherein any change ball positioned above the master pin can not be deposited into the retainer cavity in the second rotated position.
55. (New) The changeable lock assembly of Claim 1, wherein a user key can not be an operable key for the lock when that key has a lowered contour location in a position corresponding to a pin chamber in which the charge ball is displaced on its respective retainer cavity.
56. (New) The changeable lock assembly of Claim 6, wherein the change member is a change ball, and wherein the second position in the plug is a retainer cavity in the plug.

57. (New) The changeable lock assembly of Claim 56, wherein the housing has a plurality of cylindrical driver chambers intersecting the surface of the bore, and further comprising a plurality of cylindrical drivers, each positioned and moveable within one driver chamber and being urged toward the bore surface, wherein the diameter of the driver is larger than the opening of the retainer cavity to prevent the driver from entering into the retainer cavity.

58. (New) The changeable lock assembly of Claim 6 wherein when the change tool is disposed in the second passage, the change member is displaced from its second position, the lock configuration is reset.

59. (New) The changeable lock assembly of Claim 58 wherein after the plug, with the change tool inserted in the second passage, is rotated to the first rotated position, and the change tool is removed from the second passage, the lock can be reconfigured to operate with the first user key, solely in response to insertion of the first user key inserted into the first passage and rotation of the plug to the second rotated position.

60. (New) A changeable lock assembly that can be reconfigured to operate with different keys of a set of user keys, without disassembling the lock, comprising:

a) a housing having a cylindrical bore with an inner surface and a plurality of generally cylindrical driver chambers intersecting the inner surface;

b) a plurality of cylindrical drivers, each driver being positioned and movable within one driver chamber and being urged toward the bore surface;

c) a plug having a cylindrical periphery and rotatably mounted within the bore so as to form a shear line at the interface of the bore surface and the plug periphery, the plug further having:

1) a keyway configured to receive a key selected from a subset of keys, the subset of keys including at least a first key having a first contour edge that operates the lock in a first lock configuration but does not operate the lock in a second lock configuration, and a second key having a second contour edge that operates the lock in the second lock configuration but does not operate the lock in the first lock configuration, wherein the first contour edge has at least a first contour position and a second contour position that

are differently configured than the first contour position and second contour position of the second contour edge;

2) a plurality of cylindrical tumbler chambers intersecting the periphery and the keyway, each tumbler chamber being aligned with a driver chamber when the plug is at a first rotated position with respect to the housing so as to form a pin chamber; and

3) a plurality of retainer cavities intersecting the periphery, each retainer cavity being spaced apart from a corresponding tumbler chamber and aligned with a corresponding driver chamber when the plug is at a second rotated position with respect to the housing; and

4) a change tool slot that intersects a portion of each of the retainer cavities;

d) a plurality of tumblers, each tumbler being positioned and movable within one tumbler chamber;

e) a plurality of lock configuration change balls, each change ball being associated with one pin chamber, having a first position within the pin chamber between the driver and tumbler, and a second position within the retainer cavity, and being displaced out of the retainer cavities by a change tool in the change tool slot.

61. (New) The changeable lock assembly of Claim 60 wherein each retainer cavity has an opening of a size smaller than the diameter of the driver, wherein the driver can not enter through the opening and into the retainer cavity when the plug is in its second rotated position.

62. (New) The changeable lock assembly of Claim 61 wherein the change tool is remote from the lock during operation of the lock.

63. (New) The changeable lock assembly of claim 60 wherein the same change tool can be used to reset the lock and to reconfigure the lock for any key of the subset of keys.

64. (New) The changeable lock assembly of Claim 60 wherein the lock can not be configured to operate with a user key when the change tool is disposed within the change tool slot.

65. (New) The changeable lock assembly of Claim 60 wherein the lock can be reconfigured only when all of the change balls have been disposed in their respective pin chambers.

66. (New) The changeable lock assembly of Claim 60 further comprising a plurality of master shim disposed between each tumbler pin and the change member when the change member is in its first position, the master shim having a first diameter and the retainer cavity having a second diameter, the first diameter being greater than the second diameter.

67. (New) The changeable lock assembly of Claim 66 further comprising a master key having a contour edge configured to raise the plurality of master pins above the shear line, wherein any change ball positioned above the master pin can not be deposited into the retainer cavity in the second rotated position.